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Sano Computational Medicine Seminars

Monday, 20 December 2021, 14:00-15:30 (CET)

Join us via Zoom: <https://seminar.sano.science/>

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Biosignals in personalized healthcare: perspectives and challenges

Abstract

Biosignals is an umbrella term to describe various modalities of physiological data continuously collected from human or animal subjects. Some examples of biosignals are well-known ECG (electrocardiography) and EEG (electroencephalography), but also e.g. mattress pressure data for assessing patient's sleep quality.

The development of low-cost sensors caused an outburst of research on some robust modalities which can be collected using personal sensors: heart rate variability, breathing rate, temperature etc.. In turn, we observe a large qualitative jump of our understanding of personal physiology, well-being and the relationship between different measurements and health conditions. At the same time, a number of ethical and legal issues have been identified.

In this talk we would discuss several use cases of biosignals research placed in the context of neurology and psychiatry. From there we will pick up a discussion on the challenges of clinical biosignals research. Those include building truly interdisciplinary teams guided by the principles of research integrity, supporting FAIR data management and developing efficient processes of translational research. The final goal we need to keep in sight is that the research serves its declared purpose and helps to improve patients' health and well-being.

Dr. Ekaterina Kutafina leads the team "Biosignals" within the Institute of Medical Informatics of the RWTH University Hospital in Aachen, Germany. She also holds a position of assistant professor at the Faculty of Applied Mathematics at AGH University of Science and Technology (Krakow, Poland). In her work she combines her mathematical background (PhD degree in differential equations, FAM AGH 2008) and experience



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as a medical data analyst (PhD degree in theoretical medicine “Machine learning in supporting clinical paths”, RWTH Aachen 2020).



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Her research is primarily focused on human electrophysiological data relevant for neurology and psychiatry, such as EEG (electroencephalography), microneurography and ECG (electrocardiography). In particular she is involved in different aspects of pain research, starting from FAIR research data management, through neural simulations to the employment of AI technologies. Other major projects include hospital occupancy prediction (AKTIN, German initiative for facilitating research usage of Emergency Departments data), detection of epileptic seizures from heart rate variability (monikit.com) and EEG changes linked to psychiatric medications.



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